


Improved Design for a More Lightweight Construction and Reduced Standby Power Consumption.

- Standby power reduced to 85% or less of previous models. (Applicable to 61F-GN.)
- Weighs only 85% or less of previous models. (Applicable to 61F-G3N/-G4N.)
- Easy identification of operating status with LED operation indicator.
- Increased reliability of internal relay (micro load: 5 VDC, 1 mA) to enable PLC input.
- Electrode terminals and other wiring terminals are separated for easy wiring.
- Select from three mounting methods: JEM, DIN rail mounting, or screw mounting.

Note: LED operation indicator is provided on Controllers manufactured in August 1999 or later.

 Refer to *Safety Precautions for Floatless Level Controllers.*



61F-G□N (120/240 VAC) in this catalog have been discontinued at the end of March 2018.

Model Number Structure

■ Model Number Legend

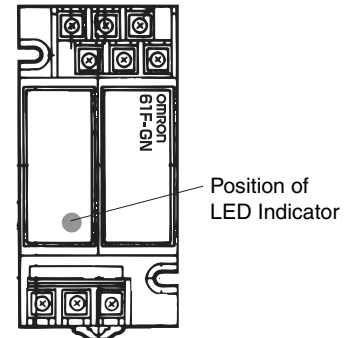
61F-□N□
1 2

1. Controller Application

- G: Automatic water supply and drainage
- G1: Automatic water supply with idling prevention or water shortage alarm
- G2: Automatic water supply and drainage with abnormal water increase alarm
- G3: Automatic water supply and drainage with full tank and water shortage alarm
- G4: Automatic water supply with water level indicator for water supply tank and water receiving tank and prevention of idling due to water shortage
- I: Liquid level indication and alarm (no two-wire models)

2. Type

- Blank: General-purpose
- L 2KM: Long-distance (for 2 km)
- L 4KM: Long-distance (for 4 km)
- H: High-sensitivity
- D: Low-sensitivity
- R: Two-wire



Note: LED indicator is provided on Controllers manufactured in August 1999 or later. It is not mounted on the case surface. It can be seen through the case.

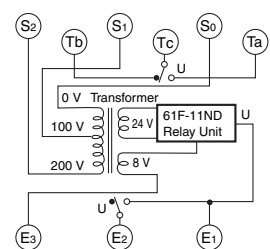
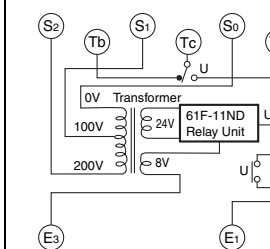
Specifications

Standard Models

Items	Type	General-purpose Controllers 61F-□N	Long-distance Controllers 61F-□NL 2KM (2 km) 61F-□NL 4KM (4 km)	High-sensitivity Controllers 61F-□NH
Controlling materials and operating conditions		For control of ordinary purified water and wastewater	For control of ordinary purified water and wastewater. Particularly in cases where the distance between the pumps and water tanks or between supply and receiver tanks are far apart or where remote control is required.	For control of liquids with high specific resistance, such as distilled water
Rated voltage		100/200, 110/220 or 120/240 VAC, 50/60 Hz (both supported on same model)		
Allowable voltage fluctuation range		85% to 110% of rated voltage		
Inter-electrode voltage		8 VAC		
Inter-electrode current		Approx. 1 mA AC max.		
Power consumption		GN□: 3 VA max., G1N□, G2N□, IN□: 4 VA max., G3N□: 5.5 VA max., G4N□: 8.5 VA max.		
Inter-electrode operation resistance (recommended values)		0 to approx. 4 kΩ	0 to 1.8 kΩ (for 2 km) 0 to 0.7 kΩ (for 4 km)	Approx. 10 kΩ to 40 kΩ (See note 4.)
Inter-electrode release resistance (recommended values)		Approx. 15 k to ∞Ω	4 k to ∞Ω (for 2 km) 2.5 k to ∞Ω (for 4 km)	Approx. 100 k to ∞Ω
Cable length (See note 2.)		1 km max.	2 km max. 4 km max.	50 m max.
Output		3 A, 200 VAC (Resistive load)		
Ambient operating temperature		-10 to 55°C		
Ambient operating humidity		45% to 85%		
Insulation resistance (See note 3.)		100 MΩ min. (at 500 VDC)		
Dielectric strength (See note 3.)		2,000 VAC, 50/60 Hz for 1 min.		
Life expectancy		Electrical: 250,000 operations min. Mechanical: 10,000,000 operations min.		
Weight		GN models: 315 g; G1N, G2N, IN models: 410 g; G3N models: 625g; G4N models: 870 g		
Internal Circuit Diagrams		Example: 61F-GN 	Example: 61F-GNL 	Example: 61F-GNH

Note: 1. The □ in the model name represents G, G1, G2, G3, G4, or I.

- The length when using completely insulated, 600-V, 3-core (0.75 mm²) cabtire cables. Usable cable lengths will become shorter as the cable diameter or number of cores becomes larger due to increased floating capacity. For details, refer to *Safety Precautions for Floatless Level Controllers*.
- The insulation resistance and dielectric strength are the values between power terminals and Electrode terminals, between power terminals and contact terminals, and between Electrode terminals and contact terminals. For details, refer to *Safety Precautions for Floatless Level Controllers*.
- Application is possible with 10 kΩ or less, however, this may cause reset failures.

Items	Type	Low-sensitivity Controller 61F-□ND	Two-wire Controller 61F-□NR
Controlling materials and operating conditions		For control of liquids with low specific resistance, such as salt water, wastewater, acid chemicals, or alkaline chemicals	For control of ordinary purified water or wastewater. Used with a Two-wire Electrode Holder (incorporating a resistor of 6.8 k Ω)
Rated voltage		100/200, 110/220 or 120/240 VAC, 50/60 Hz (supported by the same model)	
Allowable Voltage Fluctuation		85% to 110% of rated voltage	
Inter-electrode voltage		8 VAC	
Inter-electrode current		Approx. 1 mA AC max.	
Power consumption		GN□: 3 VA max., G1N□, G2N□, IN□: 4 VA max., G3N□: 5.5 VA max., G4N□: 8.5 VA max.	
Inter-electrode operation resistance (recommended values)		0 to approx. 1.8 k Ω	Approx. 0 to 1.1 k Ω
Inter-electrode release resistance (recommended values)		Approx. 5 k to ∞ Ω	Approx. 15 k to ∞ Ω
Cable length (See note 2.)		1 km max.	800 m max.
Output		3 A, 200 VAC (Resistive load)	
Ambient operating temperature		-10 to 55°C	
Ambient operating humidity		45% to 85%	
Insulation resistance (See note 3.)		100 M Ω min. (at 500 VDC)	
Dielectric strength (See note 3.)		2,000 VAC, 50/60 Hz for 1 min.	
Life expectancy		Electrical: 250,000 operations min. Mechanical: 10,000,000 operations min.	
Weight		GN models: 315 g; G1N, G2N, IN models: 410 g; G3N models: 625g; G4N models: 870 g	
Internal Circuit Diagrams		Example: 61F-GND 	Example: 61F-GNR 

- Note:**
- The □ in the model name represents G, G1, G2, G3, G4, or I.
 - The length when using completely insulated, 600-V, 3-core (0.75 mm²) cabtire cables. Usable cable lengths will become shorter as the cable diameter or number of cores becomes larger due to increased floating capacity. For details, refer to *Safety Precautions for Floatless Level Controllers*.
 - The insulation resistance and dielectric strength are the values between power terminals and Electrode terminals, between power terminals and contact terminals, and between Electrode terminals and contact terminals. For details, refer to *Safety Precautions for Floatless Level Controllers*.
 - Application is possible with 10 k Ω or less, however, this may cause reset failures.

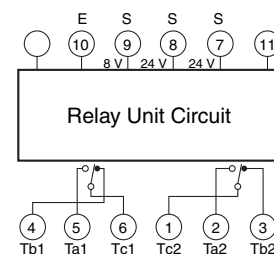
Relay Unit

The Relay Unit can be replaced without removing the wires for maintenance inspections. It can also be replaced with other Relay Units.

Compatibility with General Purpose Model (61F-11N)

General-purpose Controller	61F-11N	---
Long-distance Controllers	61F-11NL (for 2 km) 61F-11NL (for 4 km)	Provided
High-sensitivity Controllers	61F-11NH	
Low-sensitivity Controller	61F-11ND	
Two-wire Controller	61F-11NR	Not provided

Terminal Arrangement



Ordering Example

If you order the components listed above, the corresponding Relay Unit will be supplied with the Controller.

Example: If a 61F-GN Controller is ordered, a 61F-11N Relay Unit will also be included.

Connections

Automatic Water Supply Control

Compact Model
61F-GN

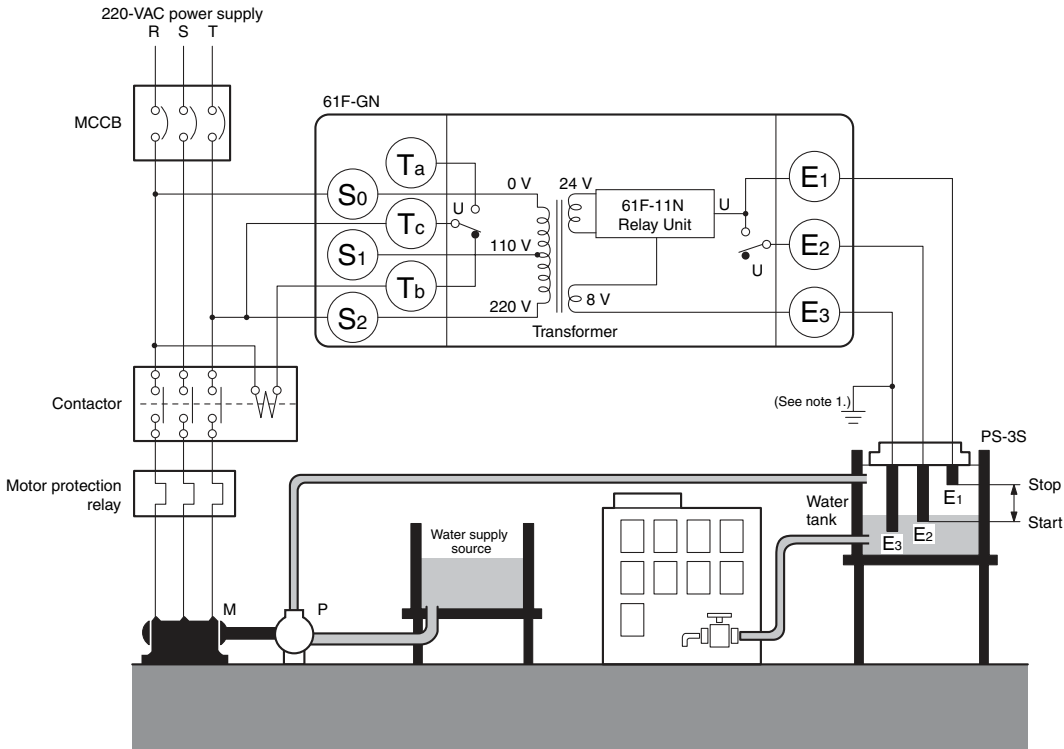
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Automatic Water Supply Control

Connections

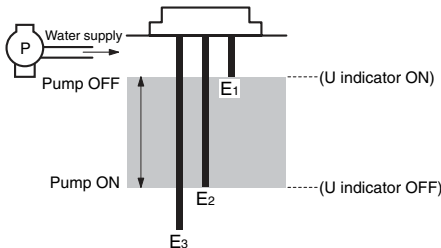
- Connect contactor coil terminal to Tb.
- Connect to power supply terminals.
S₀-S₁: 110 VAC
S₀-S₂: 220 VAC



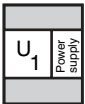
Note: 1. Be sure to ground the common Electrode E₃ (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

The pump stops (U indicator ON) when the water level reaches E₁ and starts (U indicator OFF) when the water level drops below E₂.



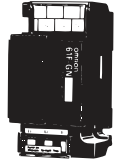
Relay Unit Layout



Automatic Drainage Control

Compact Model
61F-GN

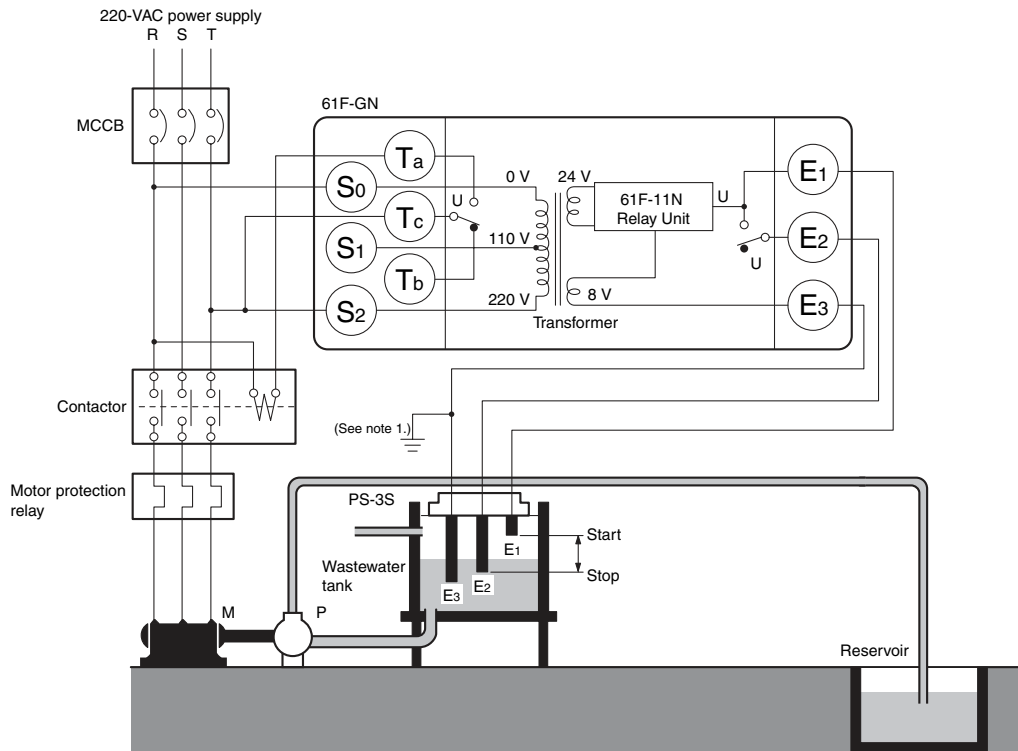
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Automatic Drainage Control

Connections

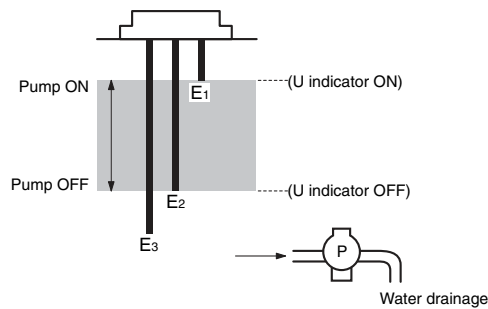
- Connect the contactor coil terminal to Ta.
- Connect to power supply terminals.
S₀-S₁: 110 VAC
S₀-S₂: 220 VAC



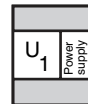
- Note: 1.** Be sure to ground the common Electrode E₃ (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

- The pump starts (U indicator ON) when the water level reaches E₁ and stops (U indicator OFF) when the water level drops below E₂.



Relay Unit Layout



Automatic Water Supply Control with Pump Idling Prevention

Compact Model 61F-G1N



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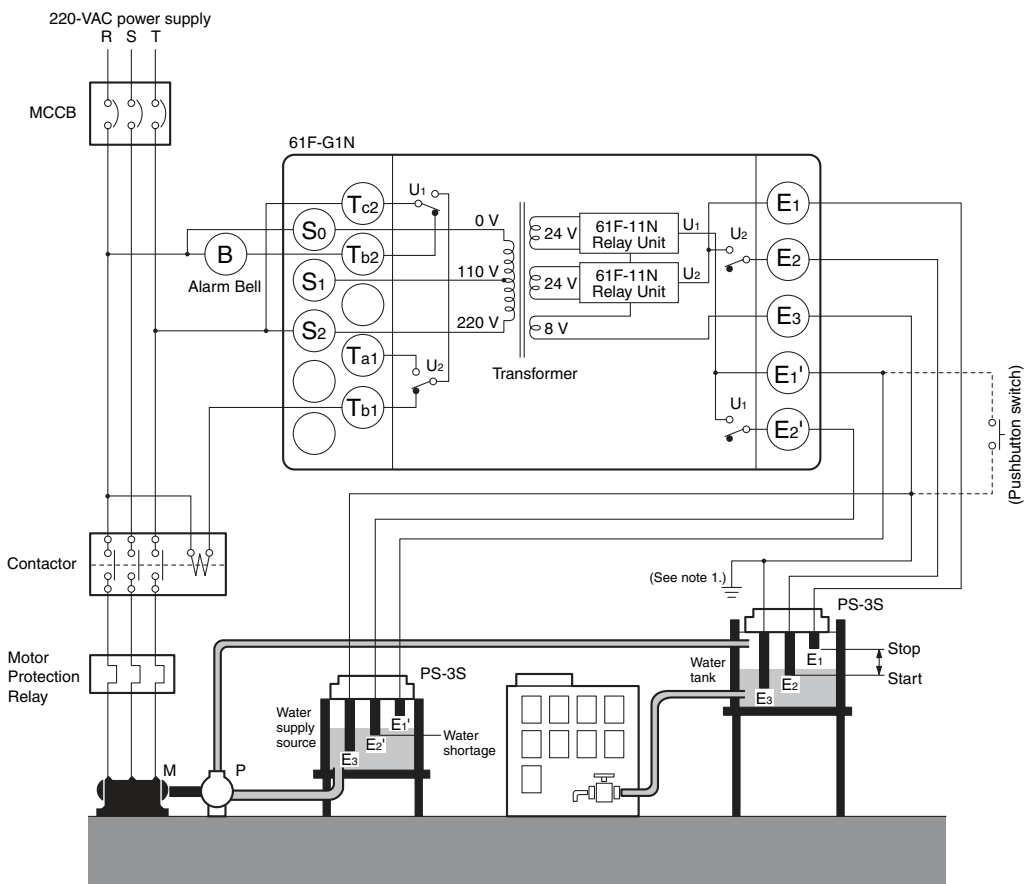
Automatic Water Supply Control with Pump Idling Prevention

Connections

- Connect to power supply terminals.
S₀-S₁: 110 VAC
S₀-S₂: 220 VAC
- Insert a pushbutton switch (NO contact) between E₁' and E₃ as shown by the dotted line.
- Do not press the pushbutton switch if the pump stops (U₁ indicator OFF) during normal operation after an alarm is given for a low water level (e.g., the water level does not reach E₂').

Test Operation/ Recovering from Power Interruptions

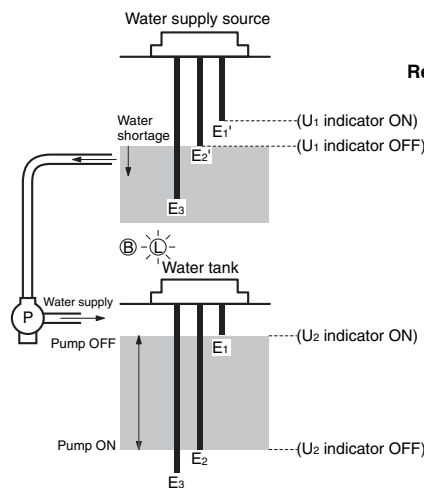
If the water supply source level has not yet reached E₁' when starting the pump or after recovering from a power interruption, press the pushbutton switch to start the pump (U₁ indicator ON) by momentarily short-circuiting E₁' and E₃.



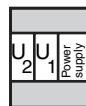
- Note: 1.** Be sure to ground the common Electrode E₃ (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

- The pump starts (U₂ indicator OFF) when the water level drops below E₂ and stops (U₂ indicator ON) when water level reaches E₁.
- The pump is forced to stop when the water supply source level drops below E₂' (U₁ indicator OFF) to prevent the pump from idling and gives an alarm.

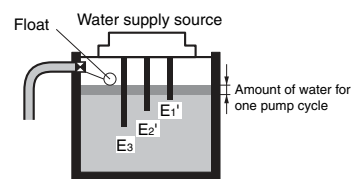


Relay Unit Layout



Note

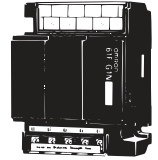
- Length of Electrode E₁'
When installing the Controller in locations where there is a possibility of momentary power interrupts or blackouts, the length of E₁' should be made so that the amount of water corresponding to one pump cycle does not expose the Electrodes. This will prevent the E₂' self-holding circuit from failing.



Automatic Water Supply Control with Abnormal Water Shortage Alarm

Compact Model 61F-G1N

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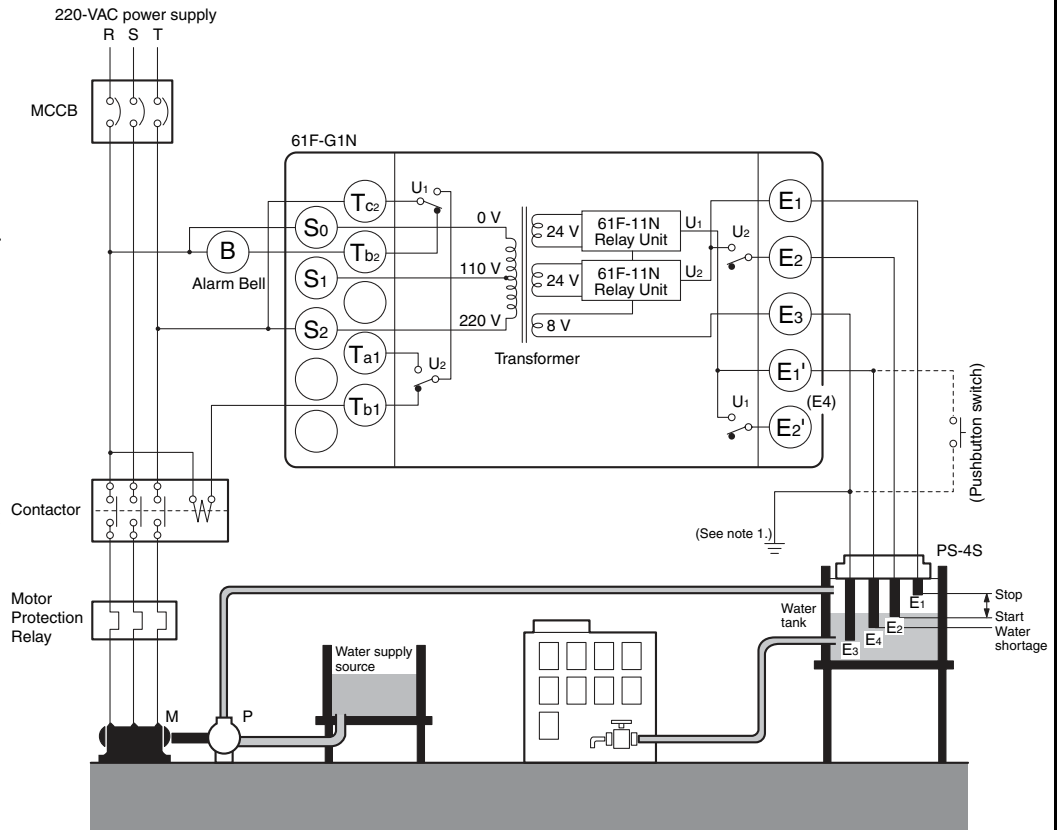
Automatic Water Supply Control with Abnormal Water Shortage Alarm

Connections

- Connect to power supply terminals.
S₀-S₁: 110 VAC
S₀-S₂: 220 VAC
- Insert a pushbutton switch (NO contact) between E₃ and E₄.
- If the pump stops upon releasing the pushbutton switch, keep pressing the pushbutton switch.
- Connect the E₄ electrode for the water shortage alarm to the E₁' terminal.

Test Operation/ Recovering from Power Interruptions

If the water level has not yet reached E₄ when starting the pump or after recovering from a power interruption, press the pushbutton switch to start the pump by short-circuiting E₃ and E₄ (U₁ indicator ON).

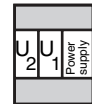
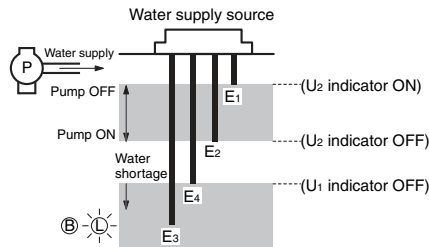


- Note:**
1. Be sure to ground the common Electrode E₃ (the longest Electrode).
 2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

- The pump stops (U₂ indicator ON) when the water level reaches E₁ and starts (U₂ indicator OFF) when water level drops below E₂.
- If the water level drops below E₄ for any reason, an alarm is given (U₁ indicator OFF).

Relay Unit Layout



Automatic Water Supply with Abnormal Water Increase Alarm

Compact Model 61F-G2N

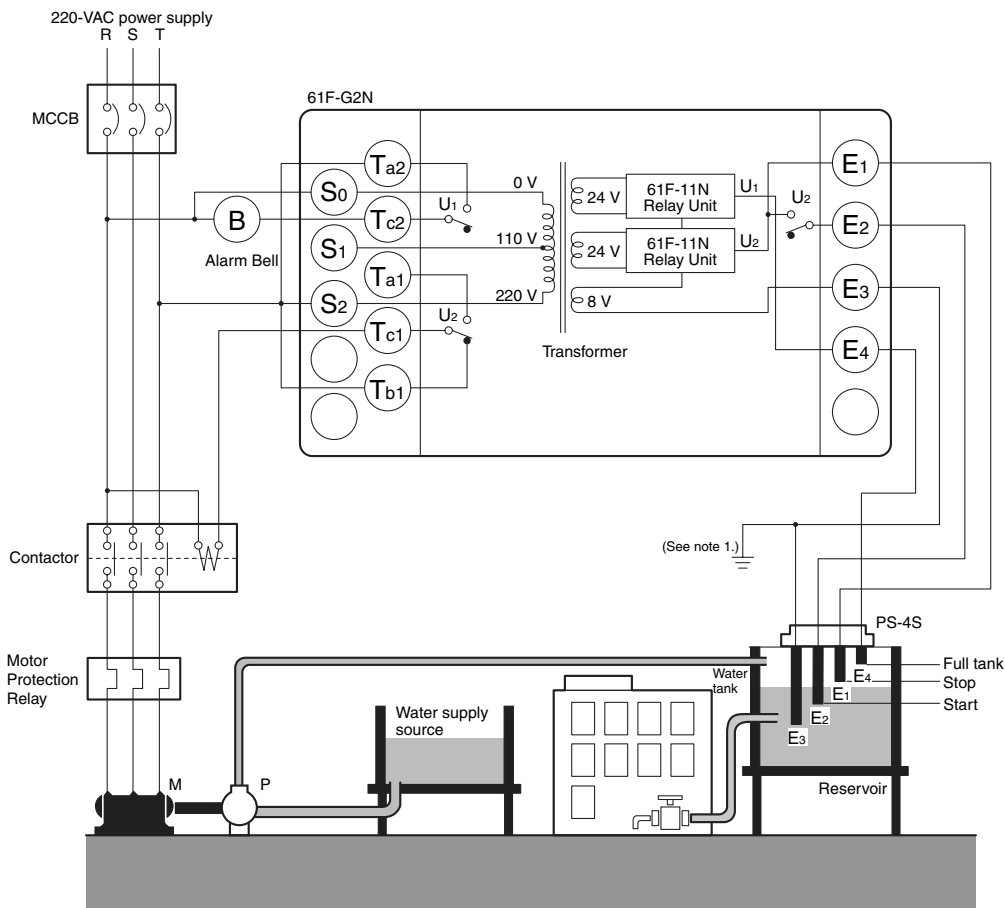
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Automatic Water Supply with Abnormal Water Increase Alarm

Connections

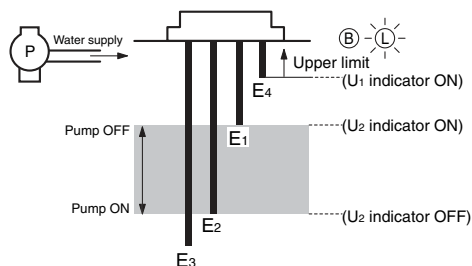
- Connect power supply terminal S₂ to terminal Tb₁.
- Connect to power supply terminals.
S₀-S₁: 110 VAC
S₀-S₂: 220 VAC



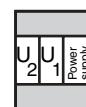
- Note: 1.** Be sure to ground the common Electrode E₃ (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

- The pump starts (U₂ indicator OFF) when the water level reaches E₂ and stops (U₂ indicator ON) when the water level rises above E₁.
- If the water level reaches E₄ for any reason, an alarm is given (U₁ indicator ON).



Relay Unit Layout



Automatic Drainage Control with Abnormal Water Increase Alarm

Compact Model 61F-G2N

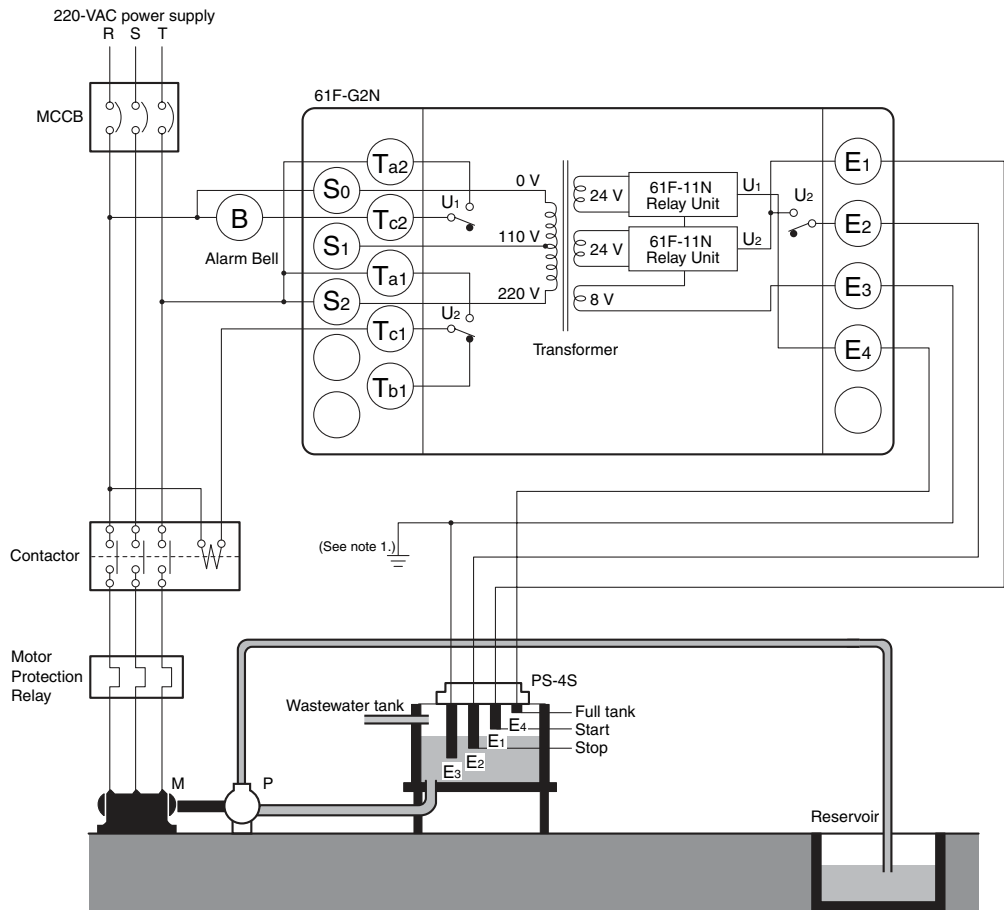
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Automatic Drainage Control with Abnormal Water Increase Alarm

Connections

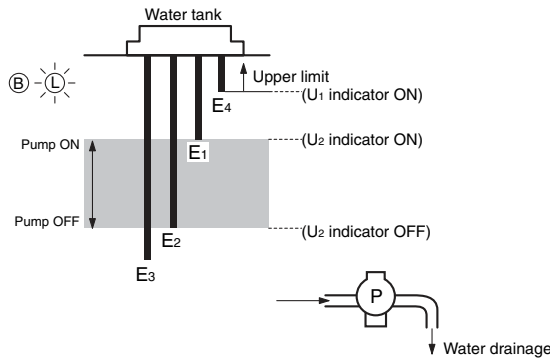
- Connect power supply S₂ to terminal Ta₁.
- Connect to power supply terminals.
S₀-S₁: 110 VAC
S₀-S₂: 220 VAC



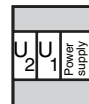
- Note: 1.** Be sure to ground the common Electrode E₅ (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

- The pump starts (U₂ indicator ON) when the water level reaches E₁ and stops (U₂ indicator OFF) when the water level drops below E₂.
- If the water level reaches E₄ for any reason, an alarm is given (U₁ indicator ON).



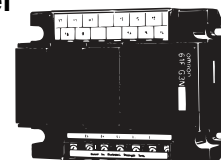
Relay Unit Layout



Automatic Water Supply Control with Full Tank and Water Shortage Alarm

Compact Model
61F-G3N

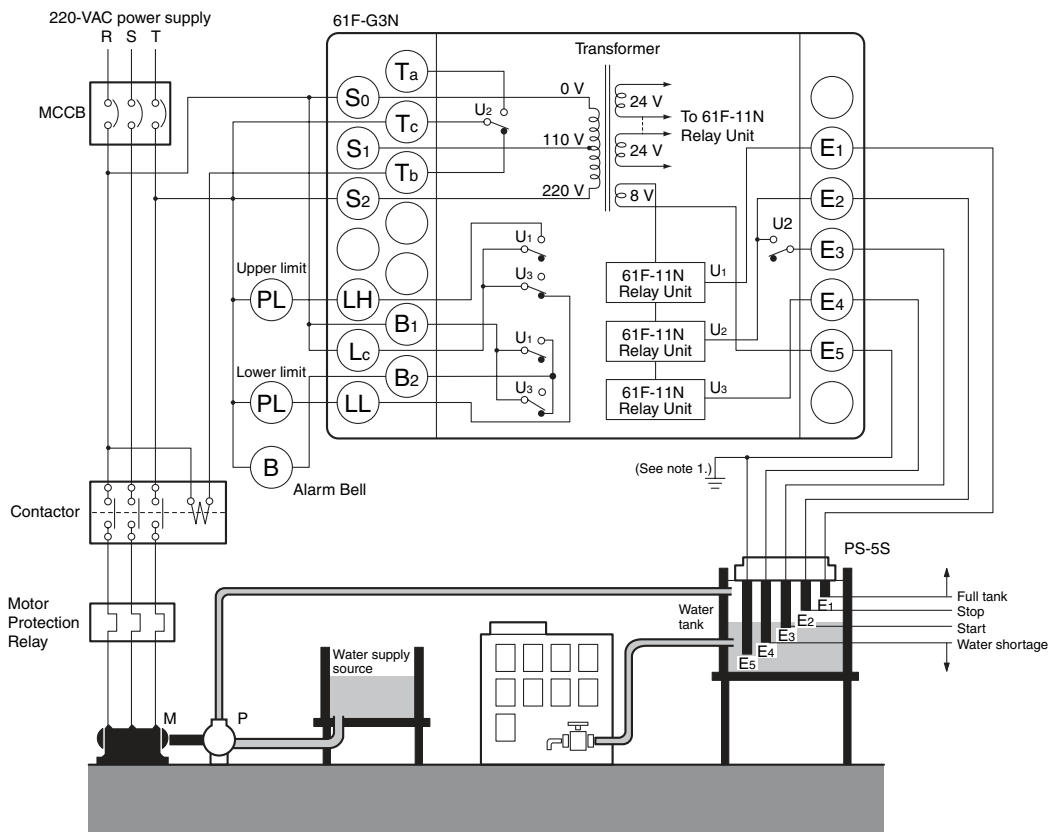
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Automatic Water Supply Control with Full Tank and Water Shortage Alarm

Connections

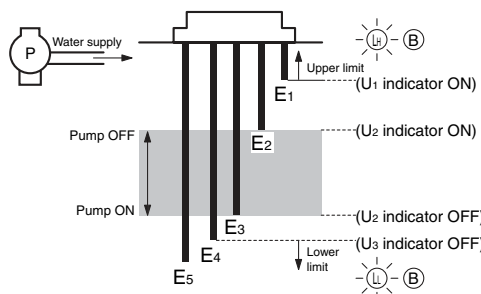
- Connect contactor coil terminal to Tb.
- Connect to power supply terminals.
S₀-S₁: 110 VAC
S₀-S₂: 220 VAC



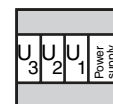
- Note:** 1. Be sure to ground the common Electrode E₅ (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

- The pump starts (U₂ indicator ON) when the water level reaches E₂ and stops (U₂ indicator OFF) when the water level drops below E₃.
- If the water level rises to E₁ for any reason, the upper-limit indicator turns ON and an alarm is given (U₁ indicator ON). If the water level drops below E₄ for any reason, the lower-limit indicator turns ON and an alarm is given (U₃ indicator OFF).



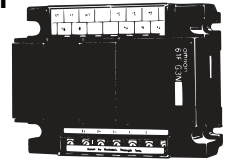
Relay Unit Layout



Automatic Drainage Control with Full Tank and Water Shortage Alarm

Compact Model 61F-G3N

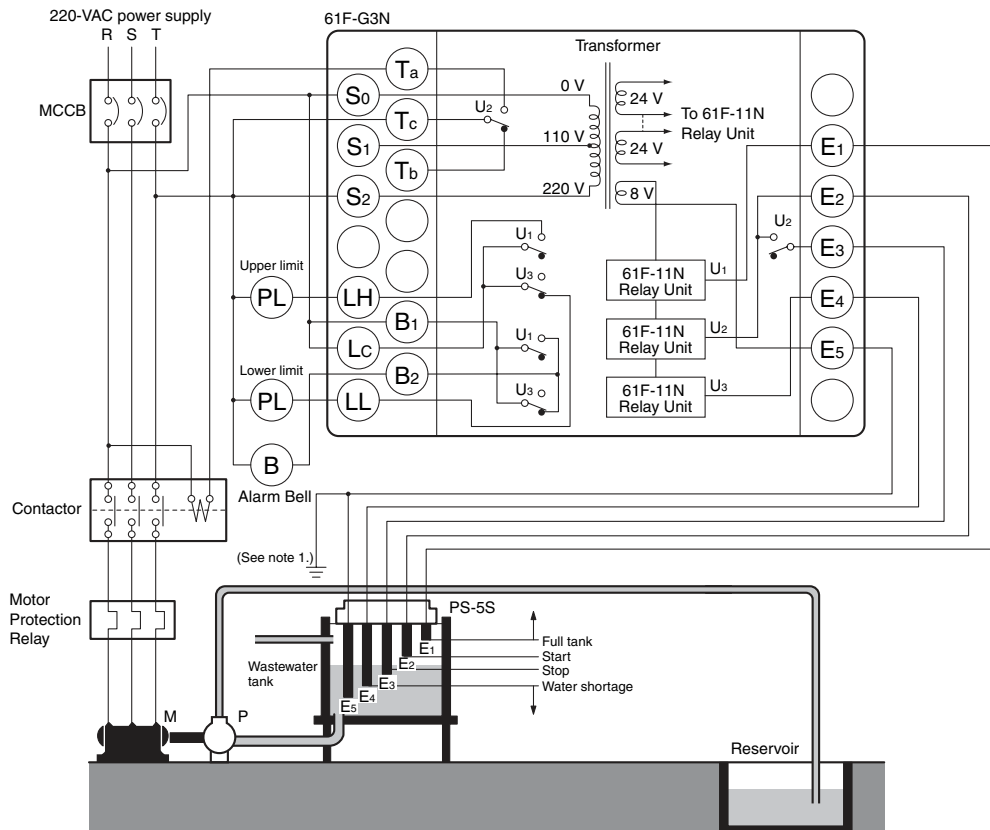
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Automatic Drainage Control with Full Tank and Water Shortage Alarm

Connections

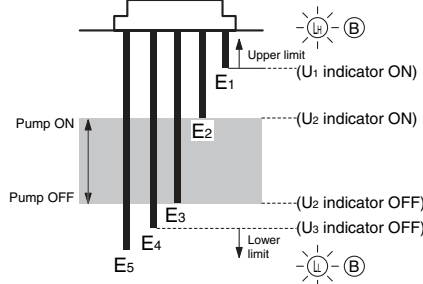
- Connect contactor coil terminal to Ta.
- Connect to power supply terminals.
S₀-S₁: 110 VAC
S₀-S₂: 220 VAC



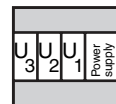
- Note: 1.** Be sure to ground the common Electrode E₅ (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

- The pump starts (U₂ indicator ON) when the water level reaches E₂ and stops (U₂ indicator OFF) when the water level reaches E₃.
- If the water level rises to E₁ for any reason, the upper-limit indicator turns ON and an alarm is given (U₁ indicator ON). If the water level drops below E₄ for any reason, the lower-limit indicator turns ON and an alarm is given (U₃ indicator OFF).



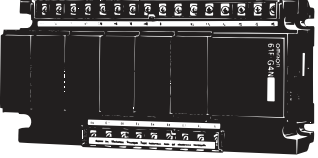
Relay Unit Layout



Water Source Level Indication with Prevention of Pump Idling Due to Water Shortage, and Automatic Water Supply Control with Indication of Water Level in Elevated Tank

Compact Model 61F-G4N

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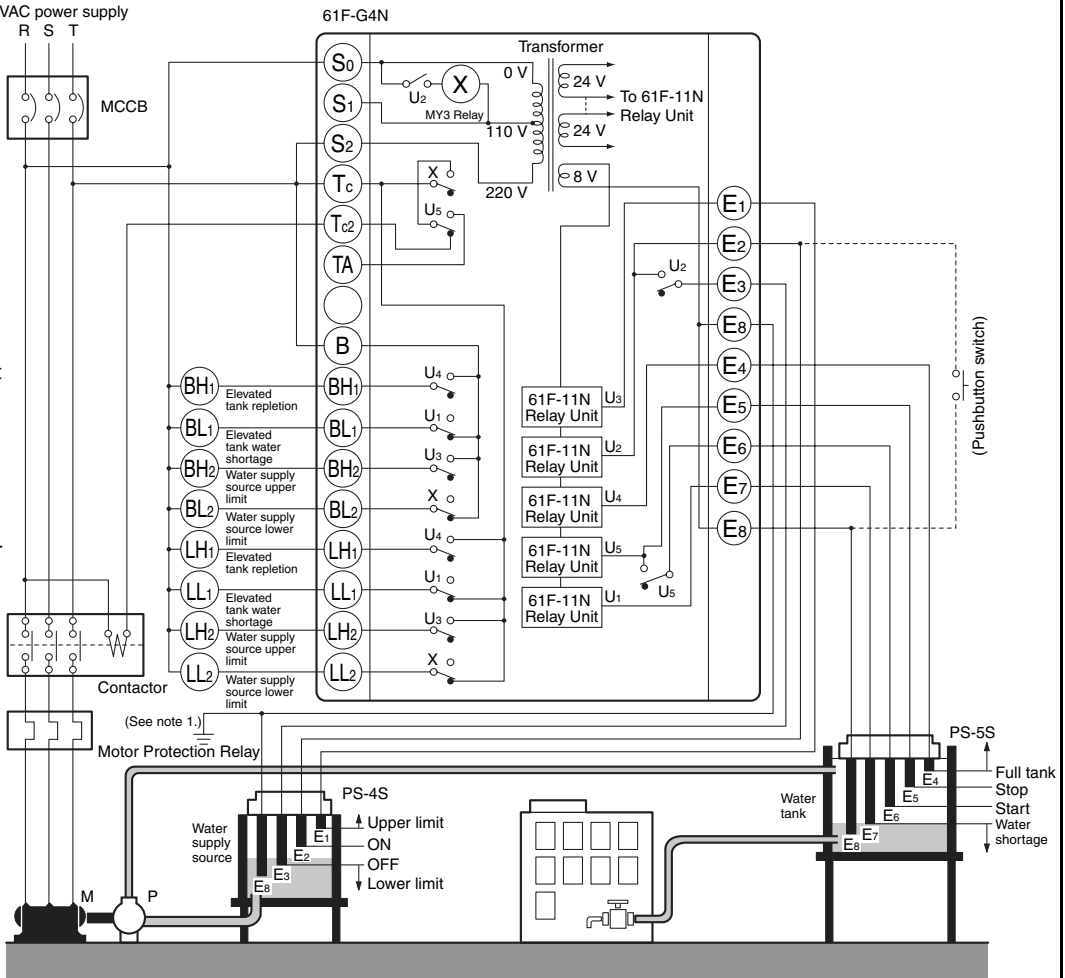
Water Source Level Indication with Prevention of Pump Idling Due to Water Shortage, and Automatic Water Supply Control with Indication of Water Level in Elevated Tank

Connections

- Connect to power supply terminals.
S0-S1: 110 VAC
S0-S2: 220 VAC
- Insert a pushbutton switch (NO contact) between E₂ and E₈ as shown by the dotted line.
- Do not press the pushbutton switch if the pump stops during normal operation after an alarm is given for low water level (i.e., the water level has not reached E₃).

Test Operation/ Recovering from Power Interruptions

When starting the pump and after recovering from a power interruption, if the water source level has not yet reached E₂ (U₂ indicator OFF), press the pushbutton switch to start the pump by momentarily short-circuiting E₂ and E₈.

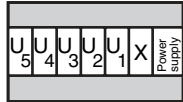


Note: 1. Be sure to ground the common Electrode E₈ (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

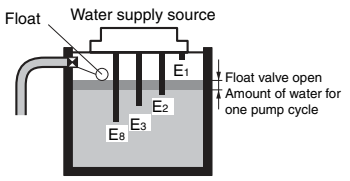
- Insert four Electrodes in the water supply source and five Electrodes in the elevated water tank.
- The lower-limit indicator for the water supply source remains ON while the water source level is below E₃ (U₂ indicator OFF).
- When the water level rises to E₂, the lower-limit indicator turns OFF (U₂ indicator ON) and the pump is ready for operation.
- When the water level reaches E₁, the upper-limit indicator turns ON (U₃ indicator ON).
- The water-shortage indicator for the elevated tank remains ON while the water level in the elevated tank is below E₇. The indicator turns OFF (U₁ indicator ON) when the water level rises to E₇.
- The pump stops (U₅ indicator ON) when the water level reaches E₅ and starts (U₅ indicator OFF) when the water level drops below E₆.
- If the water level reaches E₄ for any reason, the tank repletion indicator for the elevated tank turns ON (U₄ indicator ON).

Relay Unit Layout



Precaution

- Length of Electrode E₂
When installing the Controller in locations where there is a possibility of momentary power interruptions or blackouts, the length of E₂ should be made so that the amount of water corresponding to one pump cycle does not expose the Electrodes. This will prevent the E₃ self-holding circuit from failing.



Liquid Level Indication and Alarm

Compact Model
61F-IN

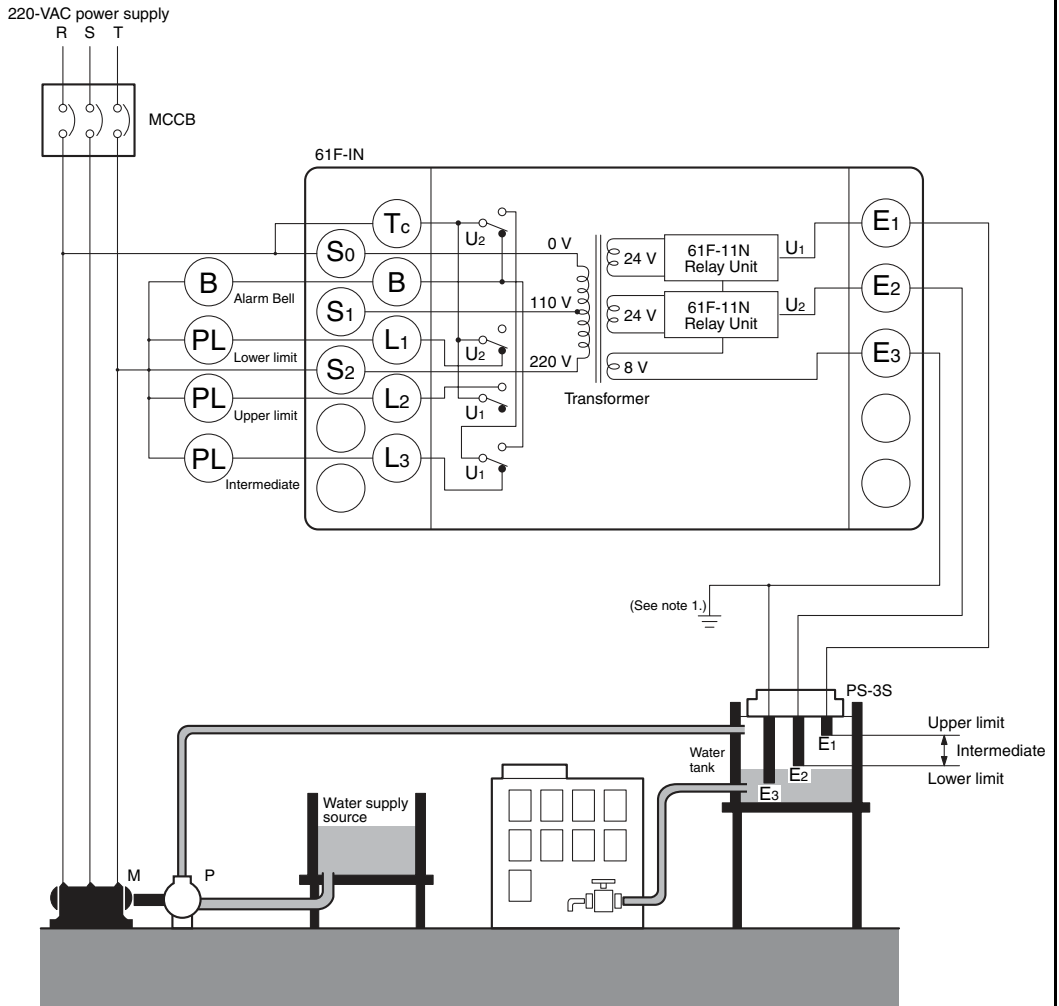
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Liquid Level Indication and Alarm

Connections

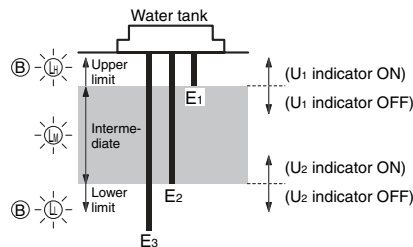
- Connect to power supply terminals.
S₀-S₁: 110 VAC
S₀-S₂: 220 VAC



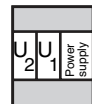
- Note:** 1. Be sure to ground the common Electrode E₃ (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

- When the water level drops below E₂, the lower-limit indicator turns ON and an alarm is given (U₂ indicator OFF).
- When the water level reaches E₂, the alarm turns OFF and the intermediate indicator turns ON (U₂ indicator ON).
- When the water level rises to E₁, the upper-limit indicator turns ON and an alarm is given (U₁ indicator ON).



Relay Unit Layout



Two-wire Connection

The wiring between the 61F Controller and the Electrodes can be reduced by removing the self-hold circuit. This arrangement is called a two-wire connection. Three Electrodes are still required. Both the 61F Controller (including the Relay Unit) and Electrode Holder must be two-wire models. Two-wire Electrode Holders have an in-built resistor of 6.8 kΩ 1W.

Automatic Water Supply and Drainage Control

Compact Model 61F-GNR

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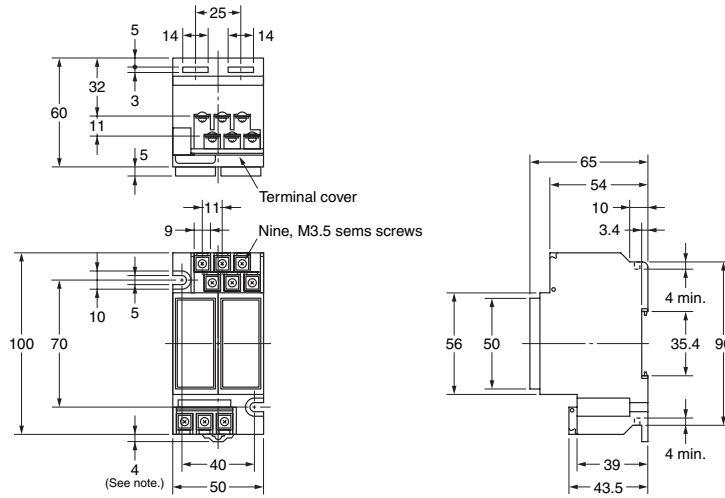


Automatic Water Supply Control	Automatic Drainage Control
<p>Connections</p> <p>Note: 1. Be sure to ground the common Electrode E₃ (the longest Electrode).</p> <p>2. The above wiring diagram is for a rated voltage of 110/220 VAC.</p> <ul style="list-style-type: none"> • Connect contactor coil terminal to Tb. • Connect to power supply terminals. S₀-S₁: 100 VAC S₀-S₂: 200 VAC • The two-wire models require only two cables for the connection between the 61F-GNR and the Electrode Holder, but still requires three Electrodes. • A Two-wire Electrode Holder must be used. (It has an inbuilt resistance R.) • The Relay Unit must also be for two-wire models. 	<p>Connections</p> <p>Note: 1. Be sure to ground the common Electrode E₃ (the longest Electrode).</p> <p>2. The above wiring diagram is for a rated voltage of 110/220 VAC.</p> <ul style="list-style-type: none"> • Connect contactor coil terminal to Ta. (Do not connect Tb.) • Connect to power supply terminals. S₀-S₁: 100 VAC S₀-S₂: 200 VAC • The two-wire models require only two cables for the connection between 61F-GNR and the Electrode Holder, but still needs three Electrodes. • A Two-wire Electrode Holder must be used. (It has an inbuilt resistance R.) • The Relay Unit must also be for two-wire models.
<p>Principles of Operation</p> <p>The pump stops (U indicator ON) when the water level reaches E₁ and starts (U indicator OFF) when water level drops below E₂.</p>	<p>Principles of Operation</p> <p>The pump starts (U indicator ON) when the water level reaches E₁ and stops (U indicator OFF) when the water level drops below E₂.</p>

Dimensions

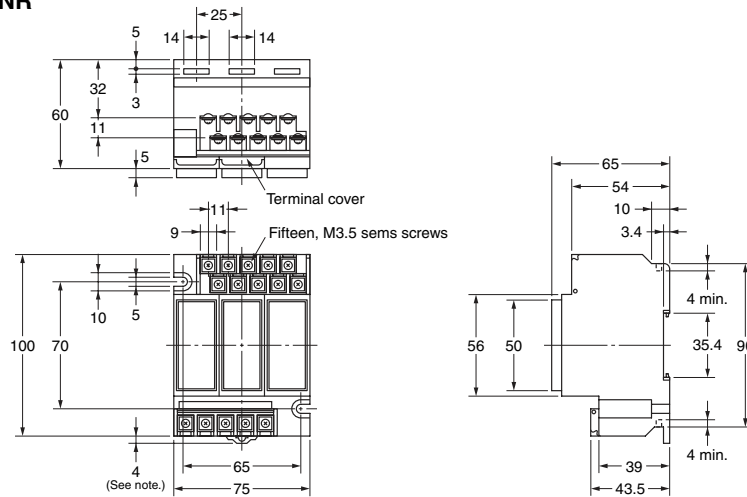
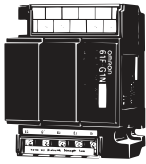
Note: All units are in millimeters unless otherwise indicated.

61F-GN, -GNL, -GNH, -GND, -GNR



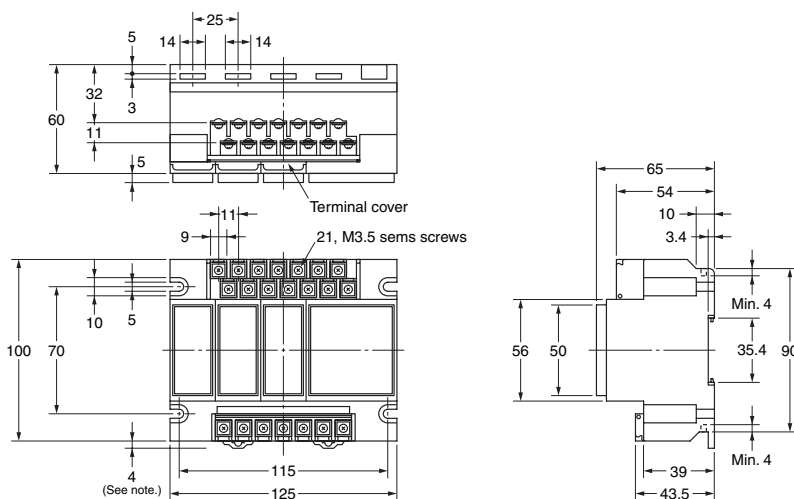
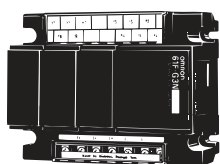
Note: Dimensions are with the DIN rail mounting (sliding) bracket attached.

61F-G1N, -G1NL, -G1NH, -G1ND, -G1NR 61F-G2N, -G2NL, -G2NH, -G2ND, G2NR 61F-IN, -NL, -INH, -IND



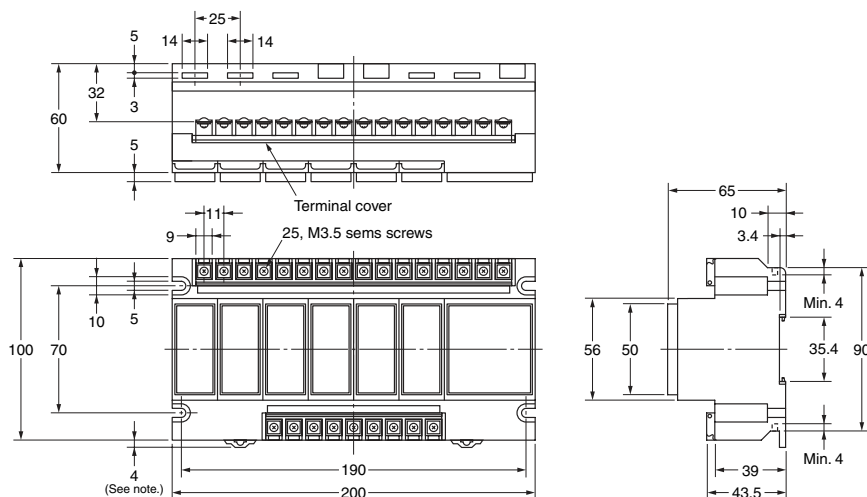
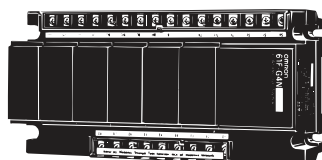
Note: Dimensions are with the DIN rail mounting (sliding) bracket attached.

61F-G3N, -G3NL, -G3NH, -G3ND, -G3NR, -G3N-NGD



Note: Dimensions are with the DIN rail mounting (sliding) bracket attached.

61F-G4N, -G4NL, -G4NH, -G4ND, -G4NR, -G4N-KYD



Note: Dimensions are with the DIN rail mounting (sliding) bracket attached.

■ Safety Precautions

Refer to *Safety Precautions for All Level Controllers*.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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